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IMPORTANCE OF KNOWING WHAT YOUR CUSTOMERS KNOW TO EFFECTIVE CIRCULAR DESIGN

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Abstract

Circular Economy, as the counterargument to the ‘take-make-dispose’ linear model, is an approach that includes a variety of schools of thoughts looking at environmental, economic, and social sustainability. In turn, it leads to a variety of strategies and often confusion when it comes to choosing the right action to implement efficient circular economy (CE) strategies, especially by companies. In particular, due to the close interplay of circular product design, business model and social responsibility, companies often struggle to develop strategies that comply with all three triple-bottom-line criteria. An analysis of a case study conducted with the University of Bayreuth and the ISPO correlating aspects of material choice in product design, labelling and technological innovation with customer preferences and education about specific material and technology features, revealed those attributes of the consumers’ environmental awareness that directly translate into an increase of purchase power - primarily connected with individual preferences regarding the sport activity and technical knowledge. Continuing from the results achieved in this latter case study, the authors of this paper researched on the potential value of a questionnaire reserved for manufacturing companies that considers inherent company assets, as well as, subjective parameters, such as customer awareness, focused on CE and sustainability. The suggested output is a tool that provides a score guiding companies to material and technology choices for circular product design, while considering business model and communication strategy to the attentive customers. Current research highlights the importance of consumers’ WTP and purchase power, therefore, such a questionnaire could underline the knowledge about the company’s and employees’ awareness about CE, as well their awareness of their customers. Resolving potential concerns highlighted in result of the questionnaire would support the development of more effective circular design strategies, while simultaneously increasing customers’ trust and loyalty. In fact, while this paper primarily carries out an analysis of gaps, limitations, and future research needed in this field, it looks to potentially develop a tool as support for companies to identify their limitations, while improving communication to their consumers who have purchase power and can lead demand towards more ecologically pronounced products.

Key words: awareness, circular design, circular economy, sports, sustainability, willingness to pay

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1. Introduction

Attention to sustainability has increased as manufacturing companies are under pressure to sustain the environment in which they operate (Bour et al., 2019). A pressure that can bring result in higher profits, since it has been identified that sustainability practices result in significant positive margins with respect to company revenues. Additionally, regulatory

bodies and governments push towards sustainable business practices through regulations, leading a need to rethink how we design and manufacture products (IPCC, 2021). In fact, on an environmental standpoint reducing the negative impact of consumption is key to comply with international standards (OECD, 2002; OECD, 2004; UNEP, 2007). Compliance to ISO standards has increased and it is demonstrated that certified companies with environmental ISO

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standards, such as ISO 14001, were able to improve their performance as compared with non-certified organizations (Kwon et al., 2002; Honk and Ruzzier, 2017; Neves et al., 2017; Treacy et al., 2019). In consequence, there is an increased awareness and pressure from multiple stakeholders to pursue more sustainable practices towards environmental benefits (Li et al., 2019).

Therefore, it appears companies have no other choice than transitioning towards higher sustainable standards for their products, services, and/or processes (Brömer et al., 2019). Simultaneously, they still need to remain profitable and for this design their offerings in such a way that they resonate with the consumers' demand for sustainability that is reflected in their willingness to pay (WTP) for those offerings. Since the WTP is connected to personal attitudes, preferences, and level of understanding for sustainability, investigating these motivations could direct practical guidelines for the design and development of successful products and services. The latter supposes the company's ability to apply effective circularity and awareness of what their customers' want and meet their increasing demands, in addition to achieving employee well-being and sustainable society. Hence, this logically requires the integration of creative problem-solving activities translating customer demands into opportunities for sustainable processes and products (Alhawari et al., 2021). Echeverría et al. (2022) demonstrate that when adding a social, and sustainable, dimension to a product the mean WTP was 7.5% higher than a standard price. Similarly, Zander and Feucht (2018) demonstrated that among different Members States of the European Union (EU) consumers were WTP for more sustainable products, especially when the applied trusted standards were well communicated. The same is observed also when applying circular economy (CE) strategies, where the WTP was higher for products where the circular economy strategies applied were correctly communicated to the consumer (EEA, 2016; 2017).

As the relationship between consumer and industries strengthens, it becomes more crucial to implement effective CE strategies and to comprehend how the transition is observed by consumers who are also placed in the forefront to sustainable development (Buerke et al., 2016; Betancourt Morales and Zartha Sossa, 2020) directing demand and purchase power.

The aim of this publication is therefore to shed light on the interrelation between corporates' awareness of circularity and circular product design strategies, in relationship to a firms' awareness of their customers' knowledge and WTP for a specific product when it is designed applying circular design. The latter awareness and knowledge should be researched through a structured questionnaire directed to manufacturing companies that considers inherent company assets as well as subjective parameters, such as customer awareness, focused on circular economy and sustainability. The outcome is a scoring system that provides guidance for material and technology

choices for circular product design, while considering business model and communication strategy to the customers.

2. Literature review

2.1. Bibliometric analysis

Generating an understanding of corporate awareness and application of circular design, requires an overview of the current result discovered in literature. An initial research on Scopus with the authors' key words "circular economy" AND "consumer" AND "willingness to pay" yielded 9 results.

The most relevant results investigate the application and consumer behaviour in view of specific CE strategies, such as leasing vs. selling (Boyer et al., 2021) second-hand clothing (van Loon et al., 2017) arguing that manufactures lack models to navigate circular business models.

In the case of the research carried out by Sabbaghi and Behdad (2018) they found that there was value both for manufacturers and consumers to repair phones and even higher for manufacturers when consumers chose not to turn to repair services. Therefore, identifying the power that consumer choice has in the potential decision the company can take to implement a CE strategy or not, also identified the researched by Mansuy et al. (2020) who identified WTP varying based on product, but also consumer-type. A similar analysis and result by Stelick et al. (2021) who identified within cereal bars that sustainability information (upcycled ingredients) appeared affecting WTP more than the products' nutritional-value.

Pretner et al. (2021) demonstrated that for products labelled CE (e.g., recycled and reused) the WTP was low, unless an efficient communication was provided to consumers, and the companies' market abilities. Similarly observed in Magnier et al. (2019) who contributed to the theoretical understanding of consumer responses to products made of recycled ocean plastic and the ability of company to direct specific campaigns to sell such products effectively. To the authors' knowledge these latter and former appear to be the only two papers effectively connecting the company's ability to launch a product so that it can be comprehended by the consumer. This further reinforcing the power of increased consumer understanding of what they purchase leading to increased WTP for specific products. In fact, this is observed in the analysis by Shen et al. (2019) of optimal product line design for green and non-green products in terms of quality differentiation, identifying that consumers' WTP based on high responsibility impacts the value of green vs. non-green production. Moreover, if the consumers' WTP is based on low responsibility the quality of green products vs. others would not matter.

CE and sustainability are already gaining more attention at the policy level (Brennan et al., 2015;

Geissdoerfer et al., 2017). As particularly evident with the European Circular Economy package (European Commission, 2015; 2020a; 2020b; 2021) and the Chinese Circular Economy Promotion Law (Lieder and Rashid, 2016). Companies are also understanding the benefits from applying CE (EMF, 2013). However, as identified, there are struggles by manufacturers to not only effectively implement CE strategies (Sabbaghi and Behdad, 2018; van Loon et al., 2017), but the same are required to successfully and clearly communicate the strategies implemented to the consumers (Magnier et al., 2019; Pretner et al., 2021), which WTP is based on several other factors (Magnier et al., 2019; Shen et al., 2019). Therefore, this literature review underlies the need to investigate where are the gaps within a company's understanding of CE business models and of their consumer's behaviour to indirectly impact WTP. Thus, as the gaps have been identified this research is crucial because it looks to underline that while struggles could be made by companies to implement CE strategies – that provide sustainability and wellbeing to society, as well as the planet – it could be less powerful when consumers are not WTP for the same.

2.2. Circular economy and consumer awareness

CE strategies are being applied as way to close the loop and reduce environmental impact, in fact, the objective of CE is to lower material input and reduce waste production (EEA, 2016) which involves strategies that help preserving products, their parts, the used materials (Ghisellini et al, 2016). CE is gaining traction in various sectors, such as academia and among policymakers (Geissdoerfer et al., 2017).

In recent years, CE has also been promoted not only to minimize burden on the environment, while stimulating the economy (Moraga et. al, 2019; European Environment Agency, 2017; Walzberg et al., 2021, Kalmykova et al., 2018) generating annually 1 trillion USD versus linear economy (Korhonen et al., 2018).

Since a CE system makes sure that there is as little, or none, waste or pollution produced as a "...framework for an economy that is restorative and regenerative by design." (Moreno et al., 2016; Morsetto, 2020), the EC is looking to improve the durability of the products, increasing recycled content, enabling product remanufacturing, restricting single-use, introducing bans on unsold durable goods, incentivizing product-as-a-service, increasing digitalization, and providing reward based on sustainability performances. Most importantly, it wants to empower consumers and public buyers to provide them with cost-saving products that can be sustainable. Data collected in the report highlights the public's purchasing power represents 14% of the EU GDP and it can also serve as a powerful driver for demand. Therefore, if it is taken into consideration the policy pressures and the consumer demand, companies must take part in this environmental shift and the EC adds in its plan the importance of the

circularity in production processes that can generate extra value and thus unlock these economic opportunities.

As previously mentioned, defined as an umbrella concept, CE is a method to promote the responsible and closed-loop use of resources. (Moraga et al., 2019). However, as the same authors identify and highlight, the exact definition is ambiguous, and the attempt of a single definition is merely unachievable. (Korhonen et al., 2018). Furthermore, these various definitions and approaches to CE have not been challenged (Betancourt Morales et al., 2020). Such inability to provide a standard definition, could make it harder and more confusing for companies to implement CE strategies. A confusion shared also when investigating the connection between CE business models and sustainability and it could be harder for small and medium enterprises, especially, to innovate in this direction. Thus, while the economic growth is understood, it is unclear how it can also support the environment (Awan and Sroufe, 2022).

As identified by Boyer et al. (2021) it should be the researchers, policymakers, and other involved stakeholders' responsibility to provide the infrastructure to facilitate the transition to effective circular business by using realistic CE labelling systems, which, as seen above, affects the consumers' WTP. The same study highlighted that while labelling products as more circular can impact consumer's WTP, it should not be confused with products who have undergone only partial CE strategies. One example are products that are labelled circular when the only strategy applied is to integrate a certain percentage of recycled material. Attention therefore should be placed on terminology and possible misuse by companies, also widely referred to as green washing (Kärnä et al., 2001; Self et al., 2010; Schaltegger et al., 2010; Schmuck et al., 2018).

Hence, in this research, the authors focus on that part of the value that can be generated by efficiently moving consumers towards a higher WTP for circular products. Furthermore, as results also identified that customers may exhibit a lower WTP for certain circular products of even 75% due to the stigma that products made of recycled products has lower quality, the educational level plays a crucial role to encourage customers to purchase products with higher circularity scores (Diddi and Yan, 2019). This makes it clear that education and awareness about CE principles play an important role in the acceptance and purchase decisions for circular products. To this point, research demonstrates that while consumers do not have a clear understanding of the term CE their intentions and demand already point in that direction (Sijtsema et al., 2019) and therefore it is crucial to integrate the knowledge about the consumers into the product development processes.

If a company cannot clearly communicate how they their products are approaching circularity, then it could become highly challenging for the consumer to know what they are buying and if they are willing to pay for it due to its additional CE qualities and trust

the company selling it. An existing overview of the literature on CE terminology (Camacho-Otero, et al., 2018) already identified by analysing a specific set of papers that, "...consumption in the circular economy is anonymous, connected, political, uncertain, and based on multiple values, not only utility." It is further highlighted that WTP is based on values and can vary from consumer to company, as well as between countries. It is quite relevant also the research by Kirchherr et al. (2017) who noticed a general research gap in addressing the consumer perspective towards CE, the authors identify that it is quite essential to investigate consumer awareness and knowledge of circularity and sustainable features of products.

3. Case study: Consumers pay more for sustainable products in the sports' sector

How do "green" consumers differentiate sustainability-related features in sporting goods is a question that not only brands have to ask when bringing new sustainable products to the market but also something that needs to be clarified at the early stages of product design.

A case study conducted with the University of Bayreuth and the world's largest trade fair for sporting goods and sportswear (ISPO) revealed those attributes of the consumers' environmental awareness that directly translate into an increase of purchase power - primarily connected with individual preferences regarding the sport activity and technical knowledge (Thormann and Wicker, 2021).

The quantitative study was implemented with the help of a choice-based conjoint analysis. In the first step, participants could choose between skis, snowboards, and surfboards as generally high-priced sports products with comparable features. Subsequently, questions were made regarding specific product features in comparison to megatrends, such as customization and digitization in the sporting goods industry, while applying a monetary value that the respondents would pay for these same features. Hence, it was possible to distinguish correlate the value of the benefits resulting from sustainable product features with the value of customization and digitization options based on the WTP of the respondents. The result was a significantly higher WTP for the sustainable feature, which was driven by personal preferences and the customer's knowledge about sustainable materials. Based on this outcome, we constituted a product development approach starting from an analysis of companies' individual perception towards sustainable product features as well as their awareness about CE enabling materials and technologies. This follows the argumentation of Barros et al. (2021), which confirms the importance of internalizing circularity principles horizontally across all company divisions to maximize the efficiency of circular product design practices in terms of environmental and economic benefits.

Assessing this awareness becomes therefore key for choosing those environmentally friendly

product concepts that resonate with the customers' education regarding material choices and drive their WTP for "greener" products. When it comes to measure WTP in sports, research highlighted that WTP was positively determined by environmental consciousness and educational level. Some studies discuss that as CE must apply a triple-bottom-line value system (Geissdoerfer et al., 2017; Ghisellini et al., 2016; Kirchherr et al., 2017) including economic, environmental and social sustainability, there is a demonstrated interest of sports companies to shift to sustainable solutions with CE models achieved through: optimizing material-technical loops, transforming product ownership into services, sharing resources, and shaping symbiotic ecosystems. However, despite how conclusive this research is, it highlights that there is a concerning switch not only by companies, but also researchers overall in the terms "circular economy" and "sustainable". A sustainable strategy is not necessarily circular; hence this latter study identifies that as companies, such as Patagonia are trying to move towards circularity their business model remains within the sustainability arena, which frequently holds an unclear terminology. Rattalino (2017) in their research of Patagonia's business model in connection with circularity advantage explored ways in which the pursue of economic, social, and environmental objectives can embrace circularity. Thus, this case study functions to further identify the complexity of providing CE strategies that are sustainable and highly influenced by the particular consumer groups, as could in sports' industry.

4. Measuring CE awareness and knowledge of consumer behaviour and communication

4.1. Preliminary interviews

To investigate the measurement of awareness CE and develop a corresponding quantitative approach the first a literature review was carried out in conjunction with direct open-question interviews (n=33) about the application, understanding, and measurement of CE within companies from different industries, such as textile, technology and electronics, construction, and research. The aim of the open-question interview was to preventively comprehend CE awareness. Thereby, the following key challenges have been identified that reflect also those exposed in Moreno et al., (2016) and Morseletto (2020):

- A large quantity of information on CE application and strategies exists online but it lacks a systematic strategic focus on the various types of industries;
- A general interest in the topic is found among all sectors, but awareness on the true potential and applicable strategies is missing at all corporate levels. Generally, the interest is focusing on specific departments (e.g., sustainability experts, CSR etc.);
- The general consumer trend towards CE is overall acknowledged but systematic quantification is

restricted to various independent sustainability aspects not integrally correlated with CE;

- Many who already have acquired some kind of sustainability certifications are not actively involved in measuring further indicators for CE due to a lack of clear standards and frameworks;
- Finally, a plethora of accredited sustainability assessment tools are available, which address specific products and sectors. CE labelling or measuring, on the other hand, is very fragmented as are the methodologies.

These interviews further highlight the confusion and challenges in the application of successful CE strategies and innovation towards this direction.

4.2. Importance of companies' and consumers' awareness

As the initial open-question interviews identified, to effectively realize circularity in product design, it is necessary to internalize the CE principles within the company. Additionally, also provide higher knowledge that reflects into clearer communication about CE application to consumers, as expressed in the literature identified. Therefore, the first step is to assess the level of knowledge and awareness. The authors decided to develop a quantitative scoring system that measures the companies' awareness of circularity along the different CE processes. The aim was to deliver a preliminary indicator that allows companies to identify the internal knowledge gaps on CE, and the gaps in regards to research about consumer behaviour, to develop targeted communication strategies needed to create a common understanding both internally and on the customer side. The goal is to turn individual knowledge into organizational intelligence, which can determine a company's innovative spirit and help to design more effective circular products (Castaneda and Cuellar, 2020). Currently the empirical knowledge is little and requires further analysis (Liakos et al., 2019).

The purpose of this circularity assessment is to provide an evaluation with short- and long-term perspectives to assist product developers, and/or decision-makers within companies with an overview of which actions should be taken to create circular product concepts that resonate with the customers (Tscheikner-Gratl et al., 2021). As previous research of sustainable product features demonstrated, the higher the consumers' awareness and company's product transparency, the higher the probability that consumers develop a high WTP. Hence, the paper's goal with the questionnaire is to transfer the potential outcomes on circular product design and implement customer preference translated into education analysis into a circularity assessment tool that considers inherent company assets as well as subjective parameters, such as awareness. The outcome provides guidance for companies on the areas of improvement for internalizing CE principles and by this determine more effective material and technology choices, while

considering business model and communication strategy to the attentive customers.

4.2.1. The questionnaire and scoring methodology

The growing awareness about CE significantly increases the interconnection between industry and the general public, because efficient circular design heavily involves the consumer side (Garbie, 2015). A questionnaire is required to identify awareness gaps within a company regarding user and company approach and understanding in regard to CE. The questionnaire draws questions from a study conducted by Hörisch et al. (2019) who identified that knowledge on factors that can support the increase of corporate sustainability action is of crucial importance. Especially, since they look at the influence of feedback and awareness of consequences on the development of corporate sustainability action. Therefore, identifying those awareness gaps in corporations becomes also essential with regard to circularity (Talbot et al., 2020). A study on the awareness of sustainability in corporate organizations conducted by Garbie (2015) looked at how corporations were aware of sustainability in general, environmentally, socially, and economically. The same author states that yet the concepts are not fully understood by all stakeholders. Therefore, it is understood that clearer communication to the public is not only needed, but crucial for CE development, then the first step must come from the industry that should be aware of CE aspects and how those can be realized in product design.

As another study suggested, CE is driven by economic and not environmental considerations, since the application of practices remains within a firm rather than across the supply chain (Masi et al., 2016; Sacco et al., 2021). It means that maximizing the economic benefits through for example an increasing WTP on the consumer side, is equally important to drive CE as it is when optimizing supply chains. Thus, all stakeholders within a supply chain should be included.

In view of aforementioned research mentioned, this paper integrates those findings in the development of the questionnaire (Fig. 1), which provides a set of closed questions (Annex I), researching firstly in the user's role in the company, age, educational level, and daily sustainability behavioural actions. It subsequently provides questions regarding the user's awareness of the company's actions on the company's transparency towards other stakeholders, and the company's application of sustainability and CE strategies during its supply chain and at the product's end-of-life.

The specific questions are drawn from the aforementioned literature to tackle the various objectives determined in the questionnaire's framework (Fig.1). The "level of awareness" is used as the measured variable and the confounding variable being the user's age, gender, role in the company, and personal belief and actions of sustainability (Haan et al., 2018; Smol et al., 2018).

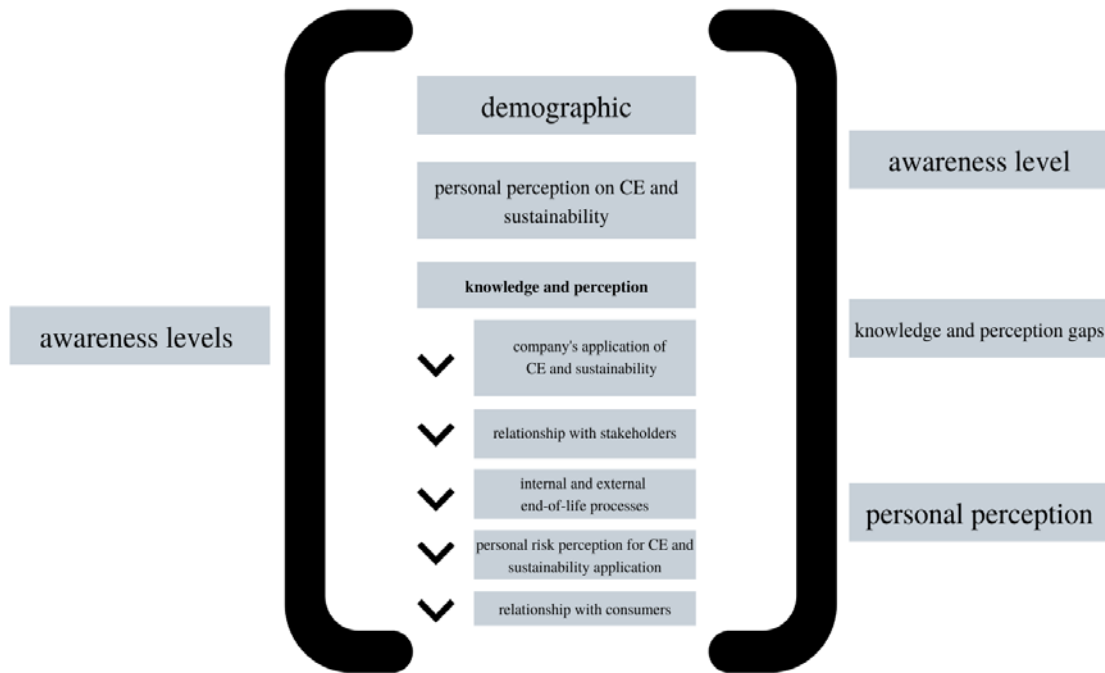


Fig. 1. Questionnaire structure and overview

The aim is questioning whether a higher awareness of sustainability, and CE, could translate into a more effective implementation of circular design. In regards to the score, every answer was given a weight between 0-3 and the final result is meant to group which weight is observed more frequently. This defines the level of awareness based on how confidently also the user was responding. For example, definitely yes and no answers were given the highest score (3) since the user is clearly sure of that particular answer. It looks to tackle data that is not numerical and can identify and highlight gaps within the corporate mindset of circularity (Maranesi and de Giovanni, 2020). The assumptions are that this method does not currently provide an overall awareness level and, being in its introductory phase, it is not directly looking at the company’s circularity performance itself, rather the impressions and awareness about CE application.

4.2.2. Preliminary results

A preliminary analysis of the results (n=15) collected highlighted some gaps that further research should tackle. The questionnaire was shared online and additionally to the same companies who carried out the interviews for a period of 5 months for a preliminary analysis of potential results.

Considering the paper’s aim to identify gaps and potential future research using this questionnaire, only partial questions were selected. The most visible change is that “definitely not” is generally an answer not provided, it appears “I don’t know” is chosen.

As observed (Fig. 2), when asked about feedback opportunities and transparency, the answers were quite balanced, hence showing that it varies among companies, yet that the same could have a positive impact if it were properly transparent. Furthermore, when it comes to the application of these CE strategies, most respondents found that it was risky, but necessary, in view that they were also thought that the consumer would probably choose a sustainable product over not which is not.

The results provided from this questionnaire highlights that further attention should be brought to the relationship that companies have with their stakeholders, employees, and consumers. Thus, it also confirms the potential that education and knowledge can bring into effective CE application (Millette et al., 2020).

5. Relevance

The relevance of the tool in the context of the circular design process comes from the understanding that effective circular design derives from not only efficient business models that take into consideration additional services (e.g., take back) but also consumers’ awareness about CE principles. For example, as demonstrated by Elzinga et al. (2020) there is a clear preference for take-back management models over leasing. Additionally, habits and consumer opinion regarding payment structures have a large influence on which circular business model to choose.

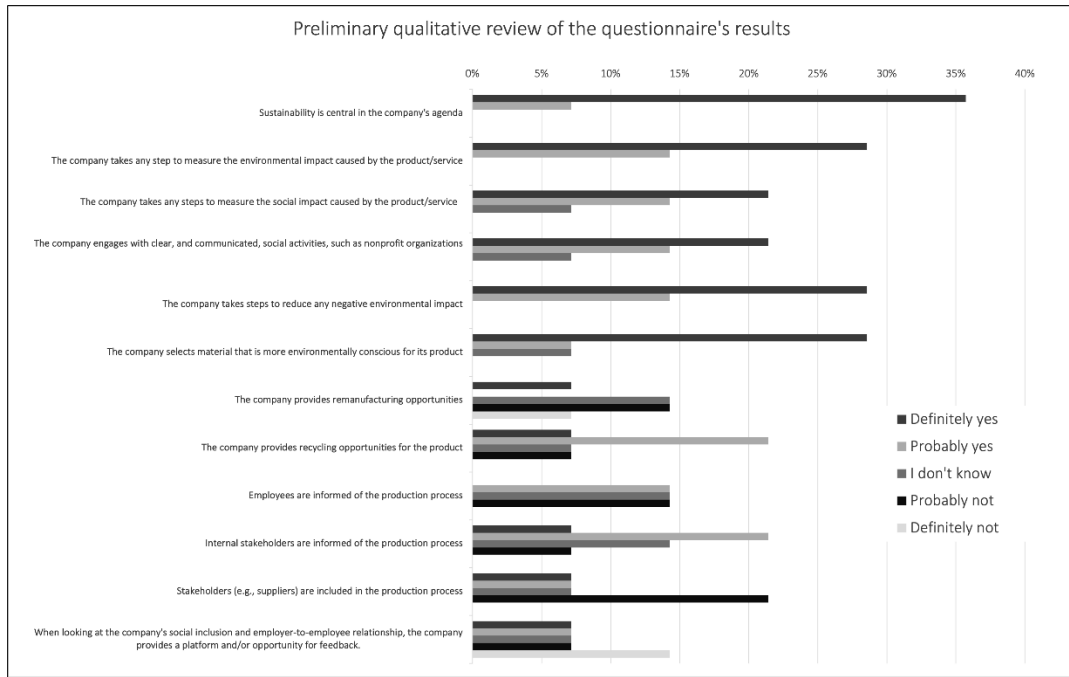


Fig. 2. Representation of partial results showing the % of answers per question on corporate governance, agenda, and application. While respondents were certain that sustainability is central to the company’s agenda, there is an increase of indecision regarding application, inclusivity, and stakeholder relationship.

However, if the company is unaware of its circularity limitations it cannot tackle improvements within the design of their products that lead to a holistic approach of circular design. Companies must take into consideration consumer preferences to create complete business models for CE (Kirchherr et al., 2017; Lewandowski; 2016; Ölander and Thøgersen, 1995; Planing, 2018; Rexfelt and Hiort af Ornäs, 2009). In particular, as our case study presented, consumers are being drawn more frequently to products that take CE and sustainability into consideration, when they are aware of the distinct CE strategies and then exhibit a higher WTP. The objective of this paper was to provide a tentative structure of awareness and CE assessment that could identify that corporations should take consumers into their model and strategies.

In particular when it comes to the sports sector, it appears, to our knowledge, that there is little about the sports sector and the implementation circular design strategies. Therefore, if we also consider that sports goods manufacturers play an important role in regional economic development, and yet cause environmental pollution (Huang and Chen, 2022), circular design could be a solution to reduce this number and its secondary inevitable effect on the environment. (Nandy et al., 2022).

Therefore, companies in the sports sector, and not only, should choose effective CE strategies by being transparent, educate, and communicate with all its stakeholders, including consumers who not only are at the forefront of sustainability development, but also WTP more for products designed with circular strategies.

6. Limitations and further research

The first limitation is that research for this paper was mainly carried out looking specifically at CE and while review highlights that there is a connection between awareness, WTP, and knowledge to drive effective circularity, lesser attention was given to specific industries or specific CE strategies. The second limitation has to do with one point raised during interviews regarding assessment tools that can be cumbersome, and that for companies it is not always easy to collect information about consumers and other stakeholders. Therefore, the authors of this paper are aware of the challenges that come with identifying the main efficient applications for sustainable CE. Due to this limitation, the scoring system could not take into consideration other methods if the company was able to collect all the required data. Furthermore, the scoring system presented in this paper does not want to become an absolute key for measurement, rather an entry step to identify a company’s gaps in various categories and act on it, to gather further awareness on consumers to drive environmental and ecological changes on circular design.

Regarding the questionnaire, further limitations could be caused by the user’s misinformation, bias, or unaware of what CE actions entitle affecting the results. Additionally, to be representative for a specific sector, a larger and adequately sample responses is needed also to validate and further test the questionnaire’s potential. Finally, companies may be unwilling to critique themselves and social desirability bias may be evident.

Further analysis and study of this questionnaire is required. However, to our knowledge no other study provides a quantified correlation between WTP and CE awareness to achieve efficient circular design highlight the crucial importance of communication among stakeholders.

7. Conclusions

A comprehensive knowledge of CE business models is required to strengthened the ability to implement effective circular product design strategies. It is understood and aware also in the literature that consumers play a crucial role by choosing what to purchase, and if they are willing to pay more for one product against another. Moreover, this occurs also when choosing a product designed according to CE strategies. Furthermore, consumers can also be at the forefront of sustainable development when effectively involved in the design process for circular product concepts.

To measure their involvement and effectively drive the awareness about CE strategies for the deployment of circular products, the author researched to develop a preliminary method that looks to assess a company's circularity awareness and measures it with an awareness scoring system. The questionnaire contributes to the guidance of companies through their areas of improvement for internalizing CE principles and by this determine more effective material and technology choices. The authors believe that this questionnaire is necessary as demonstrated with the previously carried out research in the sports industry, highlighting that not only are consumers important in driving particular decisions, but WTP for environmentally sustainable products. The latter is relevant since it provides significance that when consumers are more WTP for a particular product, firms may be directly interesting to implement certain strategies to create that same product.

To this point, the questionnaire's outcome helps to gain information about the firm and the level of circularity awareness on the organizational level, which in turn would lead to a stronger understanding of consumers collected by the firms. Hence, the questionnaire is a necessary starting point that can support the internalization of CE concepts and translate them into effective circular product design that the consumer understands and is willing to pay. The relevance of this latter statement regards the crucial element that the absence of such investigation within firms could result in products manufactured in a poorly closed-loop system that consumers are still not willing to pay for them, and are thus, not achieving the goal to pressure manufacturers to sell products that are socially, environmentally, and economically sustainable.

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